

10/26/14

Rec'd PCT/PTO 19 JAN 2005

(12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(19) World Intellectual Property Organization International Bureau



(43) International Publication Date
5 February 2004 (05.02.2004)

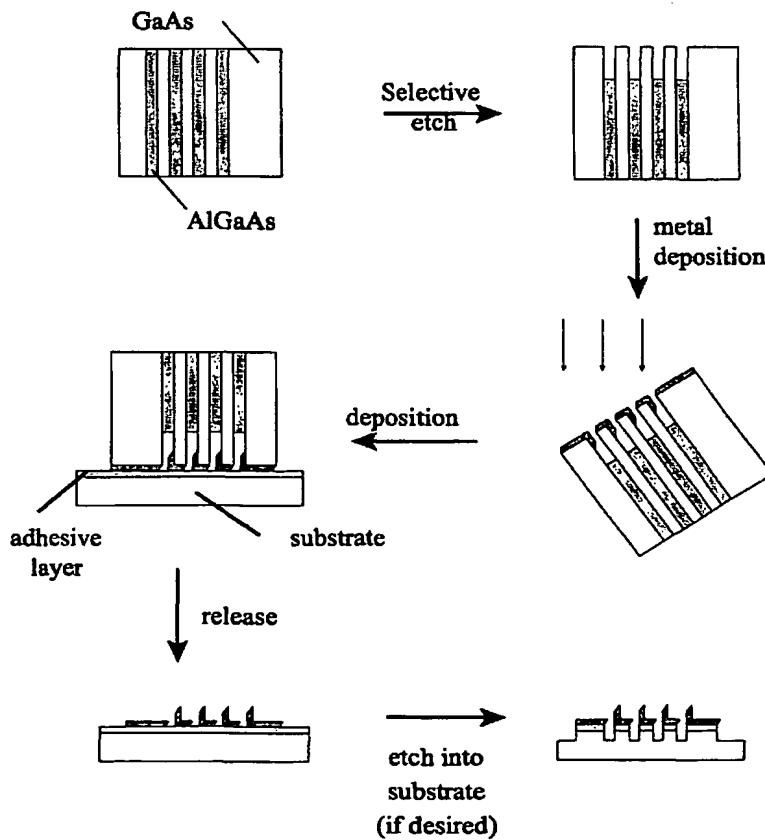
PCT

(10) International Publication Number
WO 2004/012234 A3

- (51) International Patent Classification⁷: B29C 33/00, B32B 05/02
- (21) International Application Number: PCT/US2003/023546
- (22) International Filing Date: 28 July 2003 (28.07.2003)
- (25) Filing Language: English
- (26) Publication Language: English
- (30) Priority Data: 60/399,594 30 July 2002 (30.07.2002) US
- (71) Applicant (*for all designated States except US*): THE REGENTS OF THE UNIVERSITY OF CALIFORNIA [US/US]; 1111 Franklin Street, 12th Floor, Oakland, CA 94607-5200 (US).
- (72) Inventors; and
- (75) Inventors/Applicants (*for US only*): HEATH, James, R. [US/US]; 330 Alta Vista Avenue, South Pasadena, CA 91030 (US). MELOSH, Nicholas, A. [US/US]; 4321 Fair Oaks Avenue, Menlo Park, CA 94025 (US). PETROFF, Pierre, M. [US/US]; 1730 Mission Ridge Road, Santa Barbara, CA 93103 (US).
- (74) Agent: OLDENKAMP, David, J.; Shapiro & Dupont LLP, Suite 700, 233 Wilshire Boulevard, Santa Monica, CA 90401 (US).
- (81) Designated States (*national*): AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NO, NZ, OM, PH, PL, PT, RO, RU, SD, SE, SG, SK, SL, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VN, YU, ZA, ZM, ZW.
- (84) Designated States (*regional*): ARIPO patent (GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZM, ZW),

[Continued on next page]

(54) Title: SUPERLATTICE NANOPATTERNING OF WIRES AND COMPLEX PATTERNS



(57) Abstract: Fabrication of metallic or non-metallic wires with nanometer widths and nanometer separation distances without the use of lithography. Wires are created in a two-step process involving forming the wires at the desired dimensions and transferring them to a planar substrate. The dimensions and separation of the wires are determined by the thicknesses of alternating layers of different materials that are in the form of a superlattice. Wires are created by evaporating the desired material onto the superlattice that has been selectively etched to provide height contrast between layers. The wires thus formed upon one set of superlattice layers are then transferred to a substrate.

WO 2004/012234 A3



Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IT, LU, MC, NL, PT, RO, SE, SI, SK, TR), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

— before the expiration of the time limit for amending the claims and to be republished in the event of receipt of amendments

(88) Date of publication of the international search report:
1 April 2004

Declaration under Rule 4.17:

— of inventorship (Rule 4.17(iv)) for US only

Published:

— with international search report

For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

INTERNATIONAL SEARCH REPORT

International application No.

PCT/US03/23546

A. CLASSIFICATION OF SUBJECT MATTER

IPC(7) : B29C 33/00; B32B 05/02
 US CL : 249/83, 119, 129; 264/294, 299, 330; 156/242; 428/221, 336, 343, 355R;
 According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
 U.S. : 249/83, 119, 129; 264/294, 299, 330; 156/242; 428/221, 336, 343, 355R; 257/40, 798

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 6,294,450 B1 (CHEN et al) 25 September 2001 (25.09.2001), figure 8.	14-17, 32-37
---		_____
A		1-13, 18-31
A, P	US 2003/0008505 A1 (CHEN et al) 09 January 2003 (09.01.2003).	1-37
A,E	US 2003/0219992 A1 (SCHAPER) 27 November 2003 (27.11.2003).	1-37
A, P	US 6,465,132 B1 (JIN) 15 October 2002 (15.10.2002).	1-37

Further documents are listed in the continuation of Box C.

See patent family annex.

* Special categories of cited documents:	"T"	later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
"A" document defining the general state of the art which is not considered to be of particular relevance	"X"	document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
"E" earlier application or patent published on or after the international filing date	"Y"	document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art
"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)	"&"	document member of the same patent family
"O" document referring to an oral disclosure, use, exhibition or other means		
"P" document published prior to the international filing date but later than the priority date claimed		

Date of the actual completion of the international search

26 January 2004 (26.01.2004)

Date of mailing of the international search report

13 FEB 2004

Name and mailing address of the ISA/US

Mail Stop PCT, Attn: ISA/US
 Commissioner for Patents
 P.O. Box 1450
 Alexandria, Virginia 22313-1450
 Facsimile No. (703)305-3230

Authorized officer

Donald Heckenberg
 Telephone No. 703-308-0651

D. HECKENBERG
 13 FEB 2004